

AD-A112 516

ENVIRONMENTAL AND CULTURAL SERVICES INC SAN ANTONIO TX
TERRAIN ANALYSIS AND SETTLEMENT PATTERN SURVEY: UPPER BAYOU ZOU--ETC(U)
OCT 81 K JOLLY, J GUNN

F/G 5/6

DACA63-81-M-0320

NL

UNCLASSIFIED

1 OF 1
AD-A
12 118

END
DATE
FILMED
04-82
DTIC



1.0

2.8

2.5

2.2

2.2

2.0

2.0

1.8

1.8



1.1



1.8



1.25



1.4



1.6

Minimum resolvable pattern

8

Survey Report Number 1

October 1981

Terrain Analysis and Settlement Pattern Survey:
Upper Bayou Zourie, Fort Polk, Louisiana

by
Kevin Jolly
and
Joel Gunn

DTIC
ELECTE
MAR 23 1982
B

X-CORP
Environmental and Cultural Services, Inc.
7939 Green Glen, San Antonio, TX 78255

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

82

08

000

DTIC FILE COPY

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
	AD A112516	
4. TITLE (and Subtitle) Terrain Analysis and Settlement Pattern Survey: Upper Bayou Zourie, fort Polk,, Louisiana		5. TYPE OF REPORT & PERIOD COVERED Intensive survey May 1980
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Kevin Jolly and Joel Gunn		8. CONTRACT OR GRANT NUMBER(s) DACA63-81-M-0320
9. PERFORMING ORGANIZATION NAME AND ADDRESS X-CORP Environmental and Cultural Services. Inc. 7939 Green Glen ; San Antonio, TX 78255		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NA
11. CONTROLLING OFFICE NAME AND ADDRESS Fort Worth District, Corps of Engineers Engineering Division, Planning Branch, SWFED-PR P.O. Box 17300, Fort Worth TX 76102		12. REPORT DATE October 1981
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) NA		13. NUMBER OF PAGES 56
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Archaeology, Cutlural resources, Ft. Polk, Louisiana, Vernon Parish		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) As part of a cultural resources survey of portions of the Payou Zourie drain - age, Ft. Polk, Louisiana, fourteen locations were found to contain archeological materials. These were subsequently tested and evaluated. None of the sites were deemed significant, none were in the proposed building areas, no further recommendations were made.		

TABLE OF CONTENTS

	Page
List of Figures	i
List of Plates	i
List of Tables	ii
Introduction	1
Historic Overview	1
General Setting	2
Preliminary Model	8
Methodology	12
Site Descriptions	14
Conclusions and Final Model	24
Recommendations	32
Acknowledgements	33
Appendix A	34
Geology of the Bayou Zourie Environ	
David O. Brown	
Appendix B	37
Ethnohistorical Travel Patterns in the Southeast	
Kevin Jolly and Joel Gunn	
Appendix C	40
Principal Components and Cluster Analyses of Terrain Data	
Joel Gunn	
Appendix D	42
Lithic Artifact Descriptions	
Kevin Jolly	
Appendix E	48
Ceramic Artifact Descriptions	
David O. Brown	
Appendix F	53
Historic Records of the Study Area	
Robert Guy	
Bibliography	54

LIST OF FIGURES

		Page
Figure 1	Bayou Zourie Study Area: General Topography	3
Figure 2	Bayou Zourie Study Area: Central Zone	5
Figure 3	Sand Ridge Model	5
Figure 4	Bayou Zourie Study Area: South Zone	6
Figure 5	Bayou Zourie Study Area: North Zone	6
Figure 6	Cluster Analysis: Matrix Representation	10
Figure 7	Cluster Analysis: Targeted Areas	11
Figure 8	General Site Locations	13
Figure 9	16VN437 (BZ1) Site Map	15
Figure 10	16VN438 (BZ2) Site Map	17
Figure 11	16VN439 (BZ3) Site Map	17
Figure 12	16VN440 (BZ4) Site Map	22

LIST OF PLATES

Plate Number	Page
1. Sand Ridge (16VN439)	7
2. Soil Profile from North Section	7
3. D-1	47



App. No.	✓
Project	
Contract	
Task	
Activity	
Activity Codes	
and/or	
Dist	
A	

LIST OF TABLES

Table	Page
1 (C-1) Variables and States entered into Terrain Analysis	
2 Site 16VN437 (BZ1) Description Summary	16
3 Site 16VN437 (BZ1) Material Summary	16
4 Site 16VN438 (BZ2) Description Summary	19
5 Site 16VN438 (BZ2) Material Summary	19
6 Site 16VN439 (BZ3) Description Summary	20
7 Site 16VN439 (BZ3) Material Summary	20
8 Site 16VN440 (BZ4) Description Summary	23
9 Site 16VN440 (BZ4) Material Summary	23
10 Deflated Site 16VN441 (DF1) Description and Material Summary	25
11 Deflated Site 16VN373 (DF2) Description and Material Summary	25
12 Deflated Site 16VN371 (DF3) Description and Material Summary	26
13 Deflated Site 16VN442 (DF4) Description and Material Summary	26
14 Deflated Site 16VN443 (DF5) Description and Material Summary	27
15 Deflated Site 16VN444 (DF6) Description and Material Summary	27
16 Deflated Site 16VN445 (DF7) Description and Material Summary	27
17 Isolated Find IF1 Description and Material Summary	28
18 Isolated Find IF2 Description and Material Summary	28
19 Isolated Find IF3 Description and Material Summary	29
20 Isolated Find IF4 Description and Material Summary	29
A-1 Castor Creek Profile	34
C-1 Variables and States entered into Terrain Analysis	40
C-2 Component Score Summary	41
F-1 Land Owners of the FP29-FP30 16VN437, 438 (BZ1, BZ2) Locale	53

Introduction

During May 1980, personnel of Environmental and Cultural Services, Inc., conducted archaeological investigations in the Bayou Zourie study area on the Ft. Polk Military Reservation in response to Purchase Order EN6-81-361, United States Army Engineer District, Ft. Worth.

In conjunction with a general survey of the study area, intensive investigations of selected areas were conducted utilizing occupation models generated by a preliminary terrain analysis. Fourteen locations were found to contain archaeological materials, and were subsequently tested and evaluated. This information was integrated into the final model, describing settlement patterns in the Bayou Zourie study area, and its relation to the general settlement patterns in the area of Bayou Zourie.

Historic Overview

In very general terms the Fort Polk area has a colorful history which is reported in Servello (n.d.). During the 18th Century the area became a bone of contention between the established French colonials and missionaries and the Spanish who feared French incursions into Texas. The French succeeded in establishing a permanent presence and the Spanish eventually found their communications lines to East Texas too lengthy. The Spanish therefore withdrew to the San Antonio, Texas area.

Later political history saw the development of a United States-Mexico no-man's land in the area as the same problems reappeared between Mexico and the growing U.S. presence in the old French Colony. As will happen in border areas, a criminal element filtered into the unpoliced zone. This condition soon became unacceptable and occasional law enforcement efforts were made. The problem was finally resolved with the Texas revolution and subsequent joining of the U. S. and the Republic of Texas.

Western Louisiana did not attract a large and stable European population until the coming of the railroad in the last quarter of the 19th Century. At that time logging fostered a relatively dense population. This fact is supported by the appearance of land in the Central Zone of the study area in land records during the 1890s. In 1890 a man named Wood owned the place. During the subsequent decades sparse records on the area (Appendix F) indicate that the land changed hands several times.

General Setting

The Bayou Zourie study area is situated along the northeastern periphery of the Bayou Zourie drainage in west central Louisiana. The study area can be divided into three general topographic zones (Fig. 1): 1.) the Southern zone, characterized by high elevations and steep slopes; 2.) the Central zone, characterized by a more gently sloping terrain with incised erosional channels; and 3.) the Northern zone, characterized by gentle concave and convex slopes (see Table C-1 for illustration of slope convexity).

The topographic zones correspond to three general soil zones. The Southern zone exhibits a surface stratum of erosion resistant sands (see Appendix A for geology). Thanks to the erosion resistant sands protecting hill and ridge tops, intervening erosional channels are deeply incised and contribute to the precipitous character of the terrain. The Central zone also exhibits the erosion resistant stratum, but only as a remnant on the hilltops and along the tops of ridges between the incised drainages. The bulk of the soil is a colluvial sand and clay. To the north is a zone primarily composed of clay with extensive sheet erosion, situ-

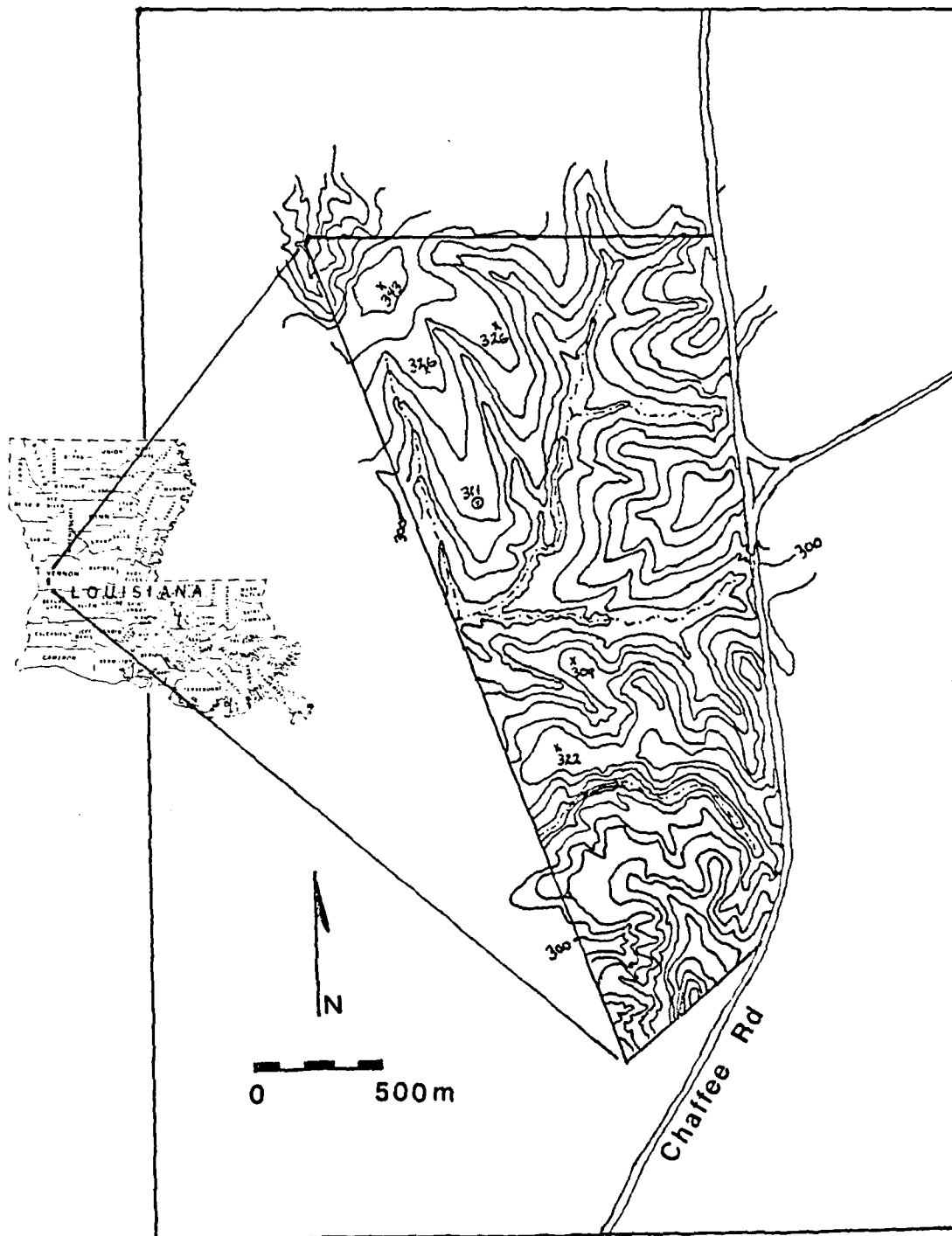


Figure 1 Bayou Zourie Study Area: General Topography

ated as it is, at the headwaters of the Bayou Zourie and most accessible to logging, etc.

Vegetation over the entire study area is generally mixed, with a second growth pine mast (loblolly/longleaf, Pinus sp.). The understory is generally deciduous (red maple, Acer rubrum; post oak, Quercus sp.), with vines and deciduous shrubs (dewberry, Rubus sp.; blackberry, Rubus sp.), huckleberry, Vaccinium and Gaylussacia sp.; wing sumac, Rhus sp.; American holly; and greenbriar) becoming very dense along the colluvial/alluvial interface just above the permanent flood plain. The flood plain itself is almost totally deciduous, with large black birch (Botula lenta) and red maple predominating. Areas that have been impacted (logging roads, clear cuts) exhibit a second growth of dewberries, huckleberries and small pines.

The areas of heaviest impact are in the Northern zone where extensive logging has taken place as evidenced by the presence of numerous logging roads, and abandoned tramways. This has probably contributed significantly to the sheet erosion evident around the headwater area. There are also a number of logging roads and barrow pits along the northern edge of the southern zone and these have contributed to the severe spot erosion in the area. In general, roads through the study area follow the course of the ridgetops, probably because they represent the remnant surface sand stratum and are generally the best drained and least likely to be rendered impassable during heavy rainfall (personal communication, Robert Murray, Fort Polk forrester, see Plate 1).

Two distinct geomorphic factors seem to be significant in the settlement pattern identified in the Bayou Zourie study area. One is the availability of a reliable source of water. The other is a preference for an occupation location that is removed from the deleterious effects of the vagaries of the weather. The presence of an erosion resistant stratum of sand along the hilltops to the south and east has facilitated the creation of geomorphological structures meeting these conditions. The central portion of the study area (Fig. 2) exhibits this stratum on the hilltop to the East, and with the floodplain to the south, west, and north, a series of minor divides have been created, with remnant sands forming the ridgetops. The ridges intersect the junctures of the branches of the permanent floodplain (Fig. 3), creating a situation where a dry elevation (remnant sand ridge) is near the greatest stream flow. The southern portion of the study area (Fig. 4) is relatively removed from the main drainage,

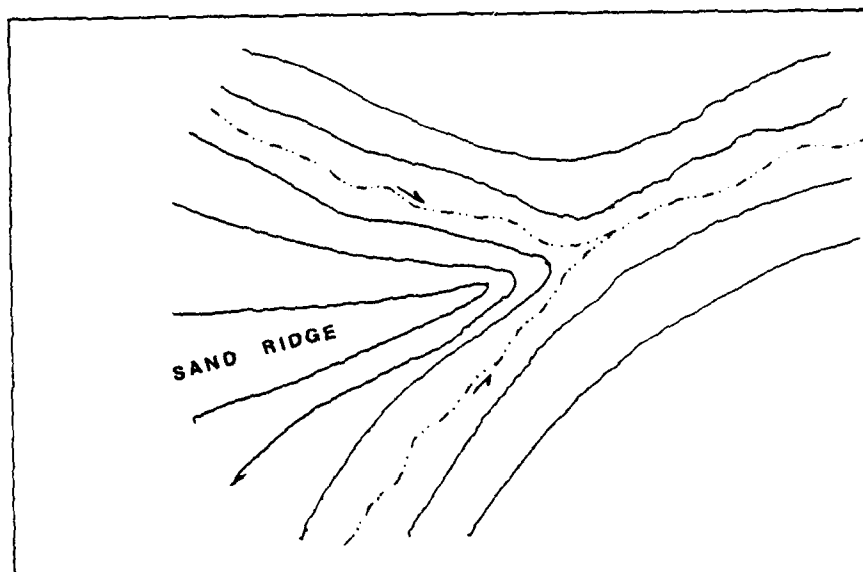


Figure 3 Sand Ridge Model

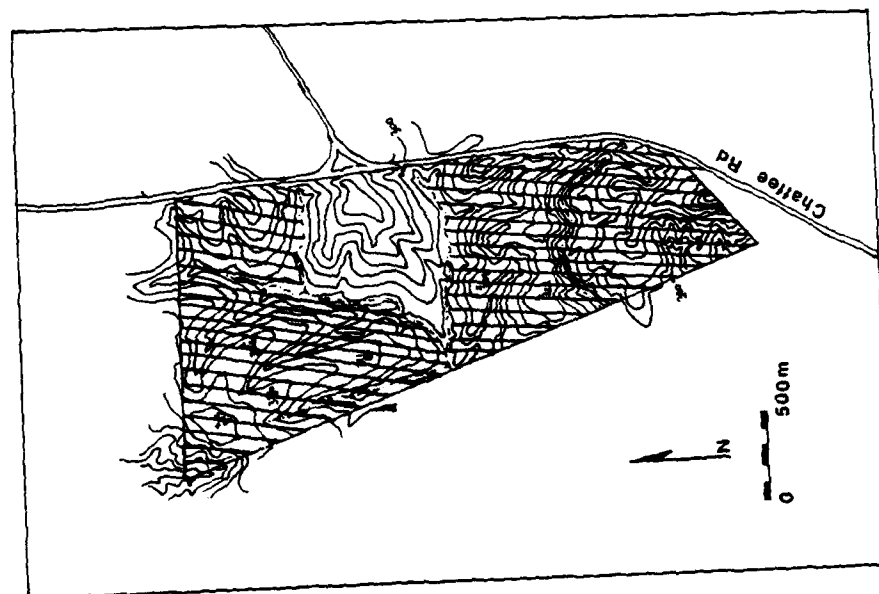


Figure 2 Bayou Zourie Study Area: Central Zone

Figure 4 Bayou Zourie Study Area: South Zone

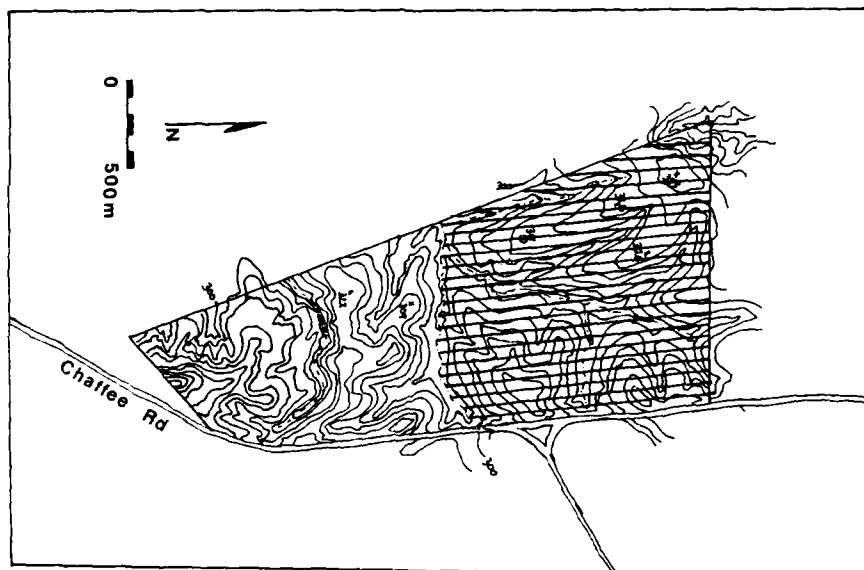


Figure 5 Bayou Zourie Study Area: North Zone

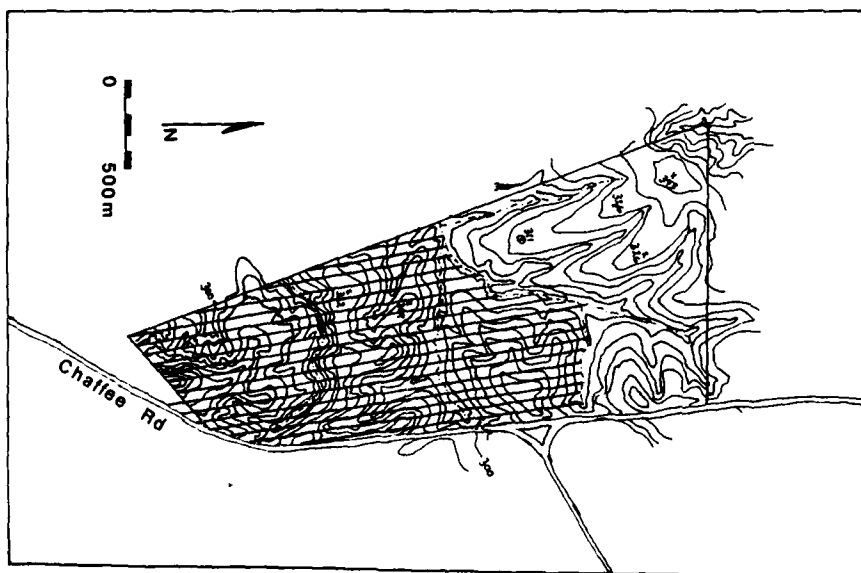




Plate 1



Plate 2

Area.
taken from

and the sand stratum remains mostly intact. This has caused localized spot erosion creating the precipitous terrain evident there. The northern portion of the study area (along the headwaters of the Bayou Zourie, Fig. 5) has been subject to extensive sheet erosion, scouring the sands and leaving the area primarily clays. The sands in this area seem to present themselves in the form of point bars in the permanent floodplain itself, and as such are unsuitable for the preservation of habitation sites.

A geomorphic feature that was of particular interest to us was the colluvial-clay interface. It follows above the permanent floodplain at the break in slope and represents a vegetational transition zone that is potentially important as an exploitative area. Archaeological investigations at Eagle Hill (16SA50), and the Peason Ridge area (Gunn nd) indicated that the colluvial-clay interface had a high habitation potential, and it was originally hypothesized that a similar situation might exist in the Bayou Zourie area. The situation in the Bayou Zourie area, however, is quite different. While the colluvial-clay break at Eagle Hill was on the upper periphery of the drainage system, and as such was above the source of permanent water, the colluvial-clay interface in the Bayou Zourie area exists just above the permanent floodplain. Under these conditions a more overriding influence on the selection of an occupation area is probably the location of a place that would remain dry through various weather conditions. Occupation in the Bayou Zourie area seems to be above the alluvium where the occupation area can remain dry and still be exploiting the vegetational transition.

Preliminary Model

To facilitate a comprehensive survey of the Bayou Zourie study area, a preliminary terrain analysis was performed. A 400 foot grid was projected over the study area and each of the 196 grid points was coded. The topographic analysis is described in Appendix C. By encoding each grid point in relation to 7 variables, a digital representation of the topography of the study area was generated, with resolution to 400 feet. A preliminary component analysis (Nie et al. 1975, Type = PA1) was per-

formed, generating 5 important underlying variables or components. These components represented 5 classes of topographic associations which, as a whole, defined the Bayou Zourie study area. (See Fig. 6, Table 1) Eleven previously identified archaeological sites were similarly coded and that data embedded in the general topographic data set. Component scores generated from the components analysis were entered into a cluster analysis (BMDP2M, Dixon 1977). This cluster analysis inferred the relationship between topographic association and site location. Of the twenty clusters generated in the analysis, three were frequently related to site locations (see Fig. 6). After plotting the clusters on a matrix representation of the study area, (Fig. 7) sections were selected that, in relation to the analysis, had a high probability for sites. An examination of these areas on the topographic map generated a general topographic association that was defined by convex slope margins near the permanent floodplain. Five of the previously recorded sites (FP's 29, 30, 27a, 27b, 32) (See Fig. 8) fell within these areas. Two areas targeted by the cluster analysis (Fig. 7 a,b) showed no previously recorded sites. Our field strategy was to locate sites found during the survey into the model and thus upgrade the model.

One significant problem in this topographic approach was the lack of soils and geomorphological information. Soon after the survey began, however, the existence of erosional remnants of sand in ridges between the drainages became apparent and this information was incorporated into the final model. These sand ridges function as the divides between drainages (see Fig. 3), and as such provide the highest elevation nearest the greatest stream flow. This information enabled us to closely examine areas which, while targeted, were not defined to that high level of resolution. A final evaluation of the model yielded an association defined by convex slope margins on remnant sand ridges near the juncture of two branches of the permanent floodplain. The previously recorded sites not predicted by this model were found to be isolated artifact occurrences in the uplands to the south. The model did predict the location of one site discovered by the field survey. The model selects areas for both cultural association and site preservation. The presence of numerous logging roads on these same areas undoubtedly functioned to the detriment of the modeled results.

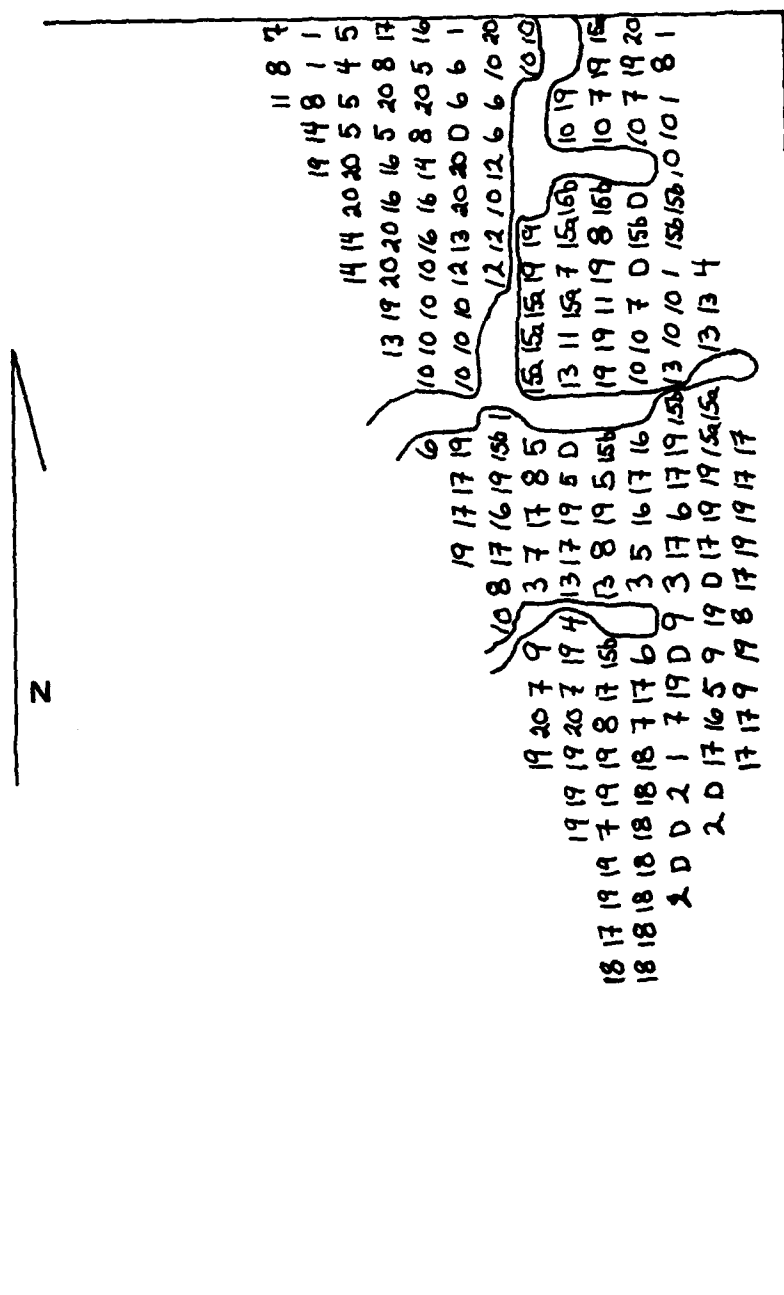


Figure 6 Cluster Analysis: Matrix Representation

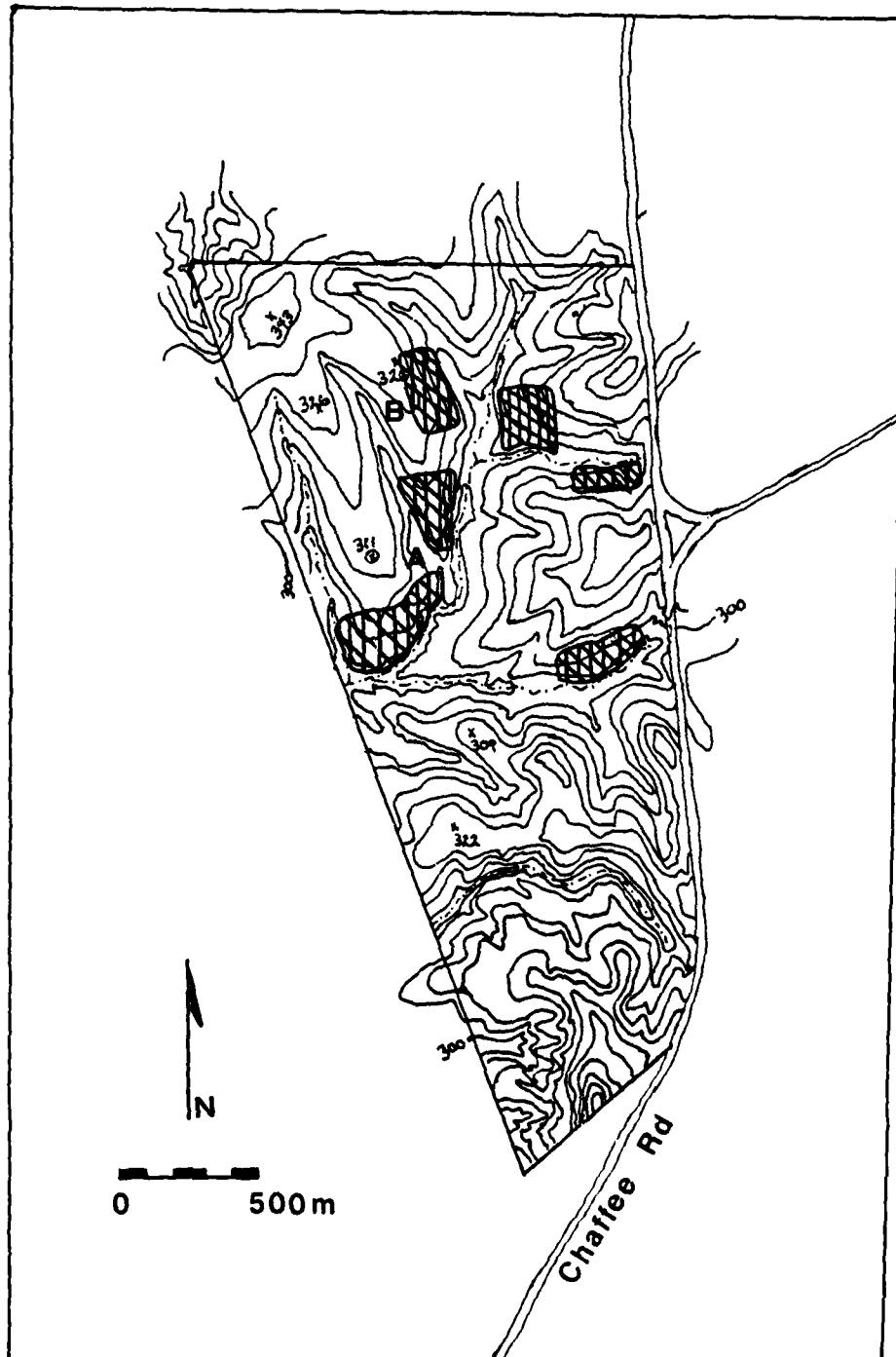


Figure 7 Cluster Analysis: Targeted Areas

Methodology

In accordance with the scope of work the general survey of the Bayou Zourie study area was concentrated on the areas designated as "buildable " (Fig.8). For the general survey a 100 foot interval, four station transect was performed, with minimal shovel testing every 100 feet, or in light of anomalous soil or topographic associations, when advisable. A running log of soil, vegetation and topographic conditions was kept for each station, (See Plate 2) permitting a final analysis at a resolution of 100 feet. This compares favorably with the preliminary analysis at 400 ft. resolution. Transects were, as terrain permitted, run east to west, and vice versa, across the study area with map and compass.

In addition to topographic, soil and vegetation information, additional notes were maintained on the extent of impact by logging, military training, etc., and any evidence of fauna and unusual flora. After the initial general survey, the areas targeted in the preliminary model were intensively tested. Series of shovel tests were performed every 100 feet in the areas targeted. The same procedures as the general survey were followed otherwise.

The areas classed as unbuildable were surveyed in the same manner as the general survey, but less intensive testing was done in order to expedite the procedure. When located, sites were first defined by the extent of surface scatter; these parameters were then mapped, and a series of 30cm x 30cm shovel tests performed to determine the extent of the buried site. These shovel tests were recorded both on the sketch map of the site, and individually as to depth and extent of cultural deposits. All material was screened through 1/4" mesh and bagged by site and test. These procedures were the same for both previously recorded and newly located sites. Isolated finds were bagged as such, noted in the log as to associations, and marked on the area map.

Dense vegetation in most areas was found to be the most significant problem. The colluvial-clay interface along the permanent floodplain presented a sometimes nearly insurmountable obstacle as greenbriar and blackberries engulfed the entire crew. The dense ground cover,

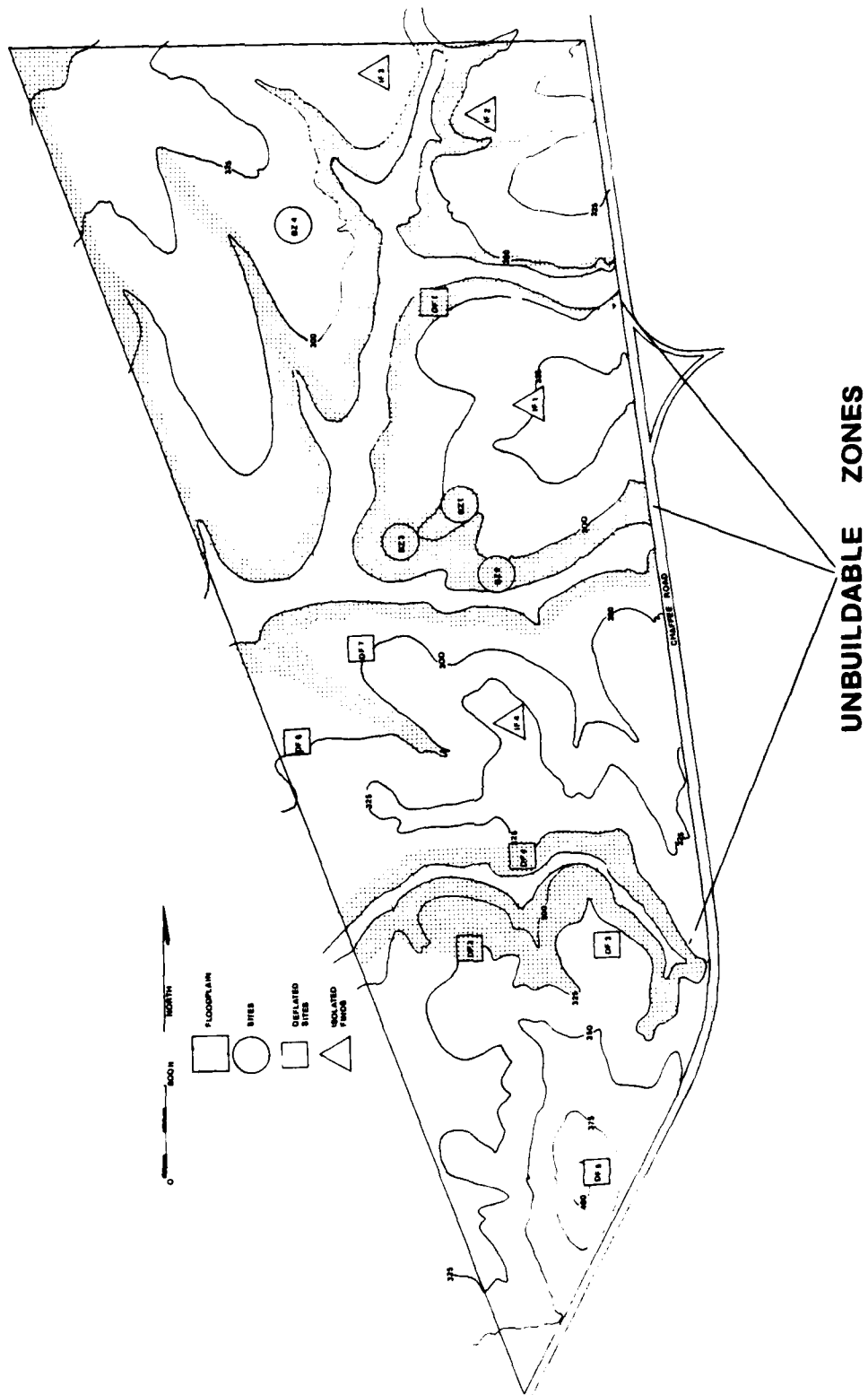


Figure 8 Bayou Zourie Study Area

composed primarily of pine needles with occasional leaves, made surface observation extremely difficult. This problem was overcome by the technique of shovel testing.

During the course of the fieldwork a range of archaeological material was encountered, extending from isolated finds to actual sites. In order to provide a basis for consistent descriptions and evaluations, a conceptual framework was established based on the parameters of spatial extent and depth. For instance, an isolated artifact has neither extent nor depth, and thus is at one end of this analytical continuum. At the other end is a site with both horizontal extent and some documentable depth below ground surface. Sites with only surface finds or sites which are deflated have extent but no depth, and would therefore stop somewhere along the continuum.

Operating within these concepts, four sites were located in the Bayou Zourie study area (16VN437, 16VN438, 16VN439, 16VN440, Fig. 8). Ten additional areas were located which, after surface and subsurface testing, were determined to represent deflated sites and isolated finds.

Site Descriptions

16VN437 (FP29) BZ1 Figs. 8, 9, Tables 2, 3
 Located on a sandy loam ridge top sloping to the northwest and southeast approximately 500 feet northeast of the juncture of the two main branches of the permanent floodplain, this area exhibits a pine mast along the top of the ridge, with heavy deciduous understory. A 1m^2 test pit and three 50 cm^2 shovel tests were excavated to the clay at approximately 30cm to determine the extent and depth of the site. Artifactual materials were concentrated in a 3m^2 area (Fig. 9) and materials were found to a depth of 25cm. The presence of historic nails, glass and an historic ceramic sherd throughout the levels seems to indicate a recently mixed prehistoric and historic site. Table 2 summarizes the associations for the site. Table 3 summarizes the materials recovered from each of the tests and the surface collection.

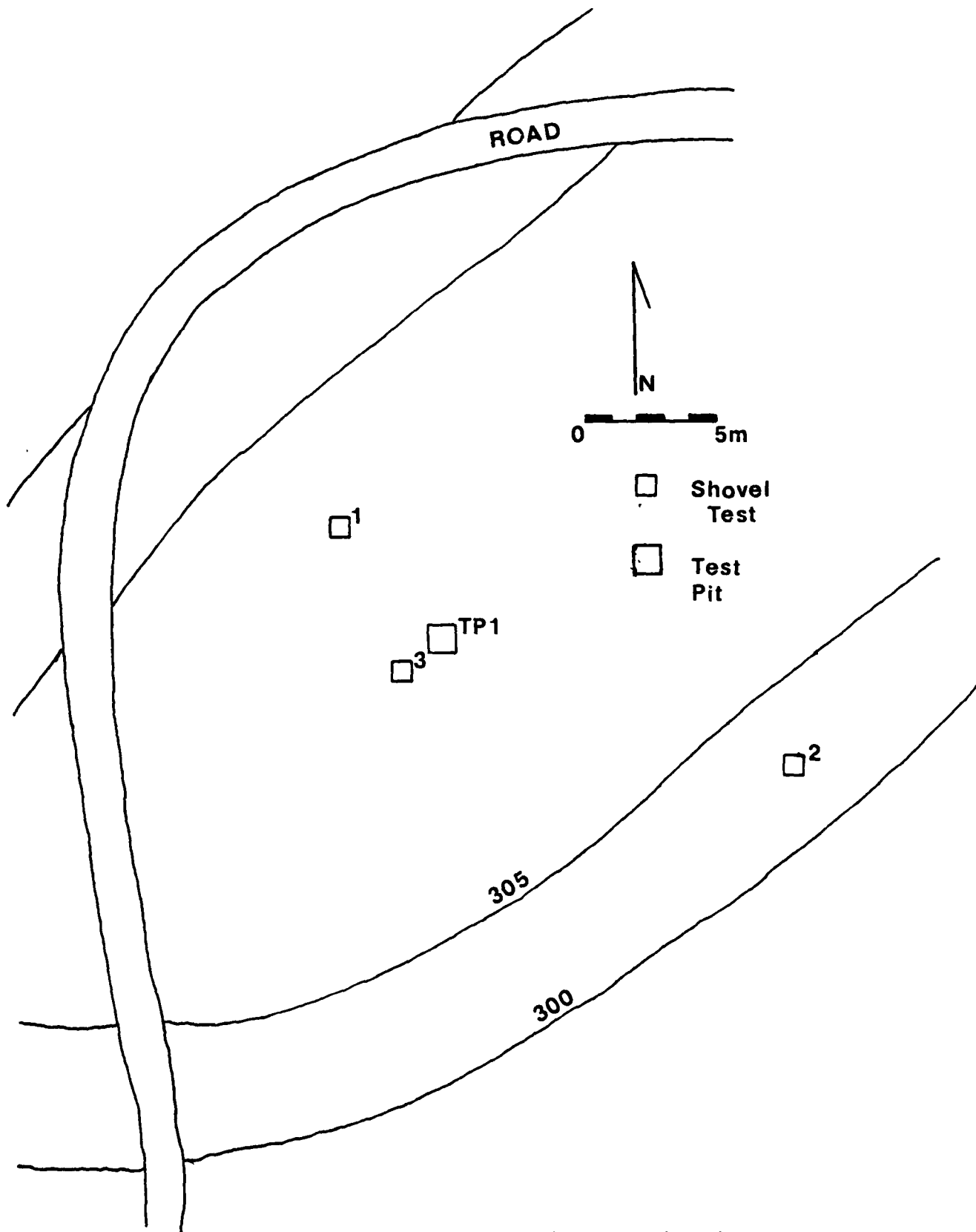


Figure 9 BZ1 Site Map, Historic/Prehistoric Site
16VN437

Table 2 Site BZ1

16VN437

FP29

Description Summary

Topographic	Ridgetop
Soil	Sandy loam to 30cm Clay to depth of test
Mast Vegetation	Pine on ridgetop Mixed on margins
Understory	Heavy deciduous shrubs on margins
Site size	Approximately 3m ²
Site Depth	Approximately 30cm

Table 3

Site BZ1

16VN437

Material Summary

FP29

Test	Primary Flakes	Secondary Flakes	Tertiary Flakes	Non-Diagnostic Tools	Diagnostic Tools*	Ceramics*	Historic*	Other
Test Pit #1								
0-10cm	—	3	3	—	—	2 (C-1,C-2)*	1 piece of glass	Iron concretion
10-20	2	6	9	—	—	—	1 sq. nail 1 historic sherd	Petrified wood
20-30	—	15	7	—	—	2 (C-3,C-4)*	1 historic sherd	5 pieces Petrified wood
Shovel Test #1	—	—	1	—	—	—	—	Iron concretion
Shovel Test #2	—	1	—	—	—	—	—	—
Shovel Test #3	—	—	—	—	—	—	—	—
Surface	—	5	9	—	—	—	—	3 clay balls Iron concre- tions 1 piece Petri- fied wood

*See Appendices D and E for Artifact Descriptions

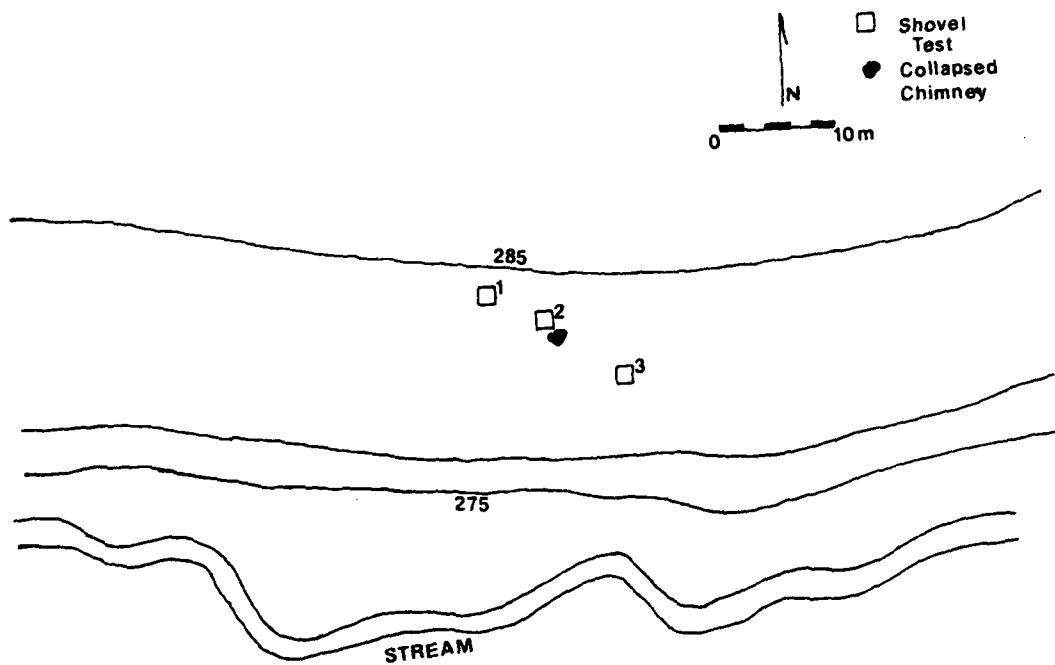


Figure 10 BZ2 Site Map 16VN438

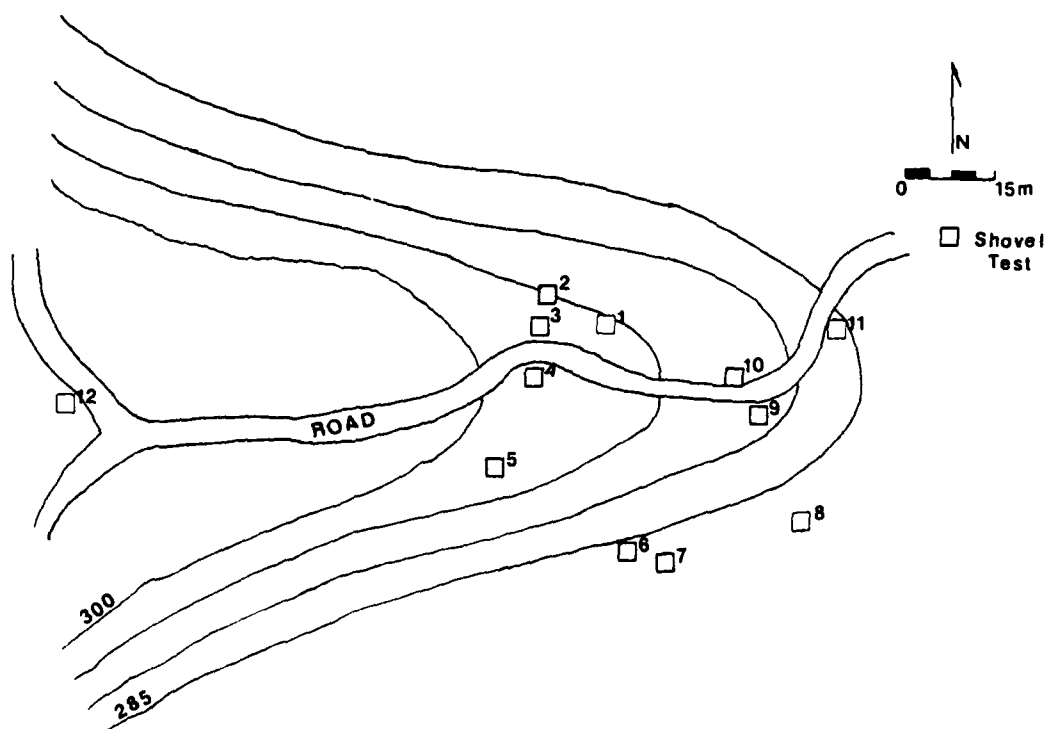


Figure 11 BZ3 Site Map 16VN439

Evaluation:

The presence of historic materials in all levels indicates a recent disturbance. No diagnostic materials were recovered and the subsurface artifact density indicates the site was minimally occupied. The lack of materials in the three shovel tests seems to indicate that the majority of the site was removed in the 1m² test unit and no further work should be necessary.

16VN438 BZ2 FP30 Fig. 8, 10, Tables 4, 5

The site is located on the slope margin of the permanent floodplain, along the colluvial/alluvial margin. The vegetation is mixed with pine and deciduous mast and medium deciduous understory. An historic component is represented by a collapsed chimney structure associated with burned wood and square cut nails. Three 50cm² shovel tests were performed revealing a minor prehistoric component, and defining the locus of occupation to be in a 4m² area directly around the collapsed chimney. (Fig. 10) Table 4 summarizes the associations for the site; Table 5 summarizes the materials recovered.

Evaluation:

The presence of a large amount of charcoal and the collapsed chimney seem to indicate that the structure (log cabin?) burned. The prehistoric component is minimal, as revealed by the testing. Existing along the periphery of the permanent floodplain this site is unlikely to incur significant impact from the planned construction and no further work is necessary.

16VN439 BZ3 Fig. 8, 11; Tables 6, 7

BZ3 is located on a remnant sand ridge approximately 100 ft. NE of the juncture of the main branches of the permanent floodplain. A pine mast is predominant along the ridgetop becoming mixed and extremely dense along the margins. A series of twelve 30cm shovel tests were performed along this sand ridge to determine the extent of the site. (Fig. 11) These showed the site to be concentrated along the top of the ridge and in consequence heavily impacted by a logging road following the ridge course. The site is approximately 40m in length with materials distributed linearly

Table 4 BZ2 16VN438 Description Summary

Topographic	Floodplain Margin
Soil	Clay loam to depth of Test - 60cm
Mast Vegetation	Mixed/Primarily deciduous
Understory	Deciduous shrubs and vines Light to medium
Site Size	Approximately 4m ²
Site Depth	Approximately 15cm

Table 5 Site BZ2 Material Summary

<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	—	—	—	—	—	1 piece of chinking	
Shovel Test #1	—	5	10	—	—	—	—	5 pieces Petrified wood
Shovel Test #2	—	—	—	—	—	—	—	

Table 6 BZ3 Description Summary 16VN439

Topographic	Tip of ridge approximately 100 feet NE of floodplain
Soil	Sand to 40cm Sandy clay below to depth of test (80cm)
Mast Vegetation	Pine on ridgetop Mixed on margins
Understory	Mixed deciduous shrubs on margins
Site size	40m x 10m (Along ridgetop)
Site Depth	30cm

Table 7 Site BZ3 16VN439 Material Summary

<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	3	4	2	1 (Biface frag) (L-1)*	—	—	—	2 pieces petrified wood 1 chunk
Shovel Test #1	—	2	—	—	—	—	—	—
Shovel Test #2	—	2	—	—	—	—	—	—
Shovel Test #4	—	1	1	—	—	—	—	—
Shovel Test #12	—	1	1	—	—	—	—	—

*See Appendices D and E for Artifact Descriptions

Note: Only shovel tests with material recovered are recorded.

along the crest of the ridge. Table 6 summarizes the associations for the site; Table 7 summarizes the materials recovered from each of the tests and the surface collection.

Evaluation:

A single biface was recovered on the surface in the road cut, and the remaining materials were non-diagnostic. Materials were recovered to 30cm near the road but artifact density for the site was extremely low. If, as the testing seems to indicate, the major occupation was concentrated along the ridgetop, then the site, in all probability, has been essentially destroyed by the impact of the logging road, and needs no further work.

16VN440 BZ4

Fig. 8, 12; Tables 8, 9

BZ4 is located on a high sand ridge approximately 120 feet west of the permanent floodplain, near the juncture of three branches of the stream. It exhibits a pine mast with very dense understory. A series of 10 30cm² shovel tests were performed along this ridgetop in order to determine the site (Fig. 12). These showed the site to be concentrated on the highest elevation. This site, also, has been impacted by a logging road following the ridgetop. The site is approximately 10m² with artifact density dropping sharply once off the elevation point. One projectile point (Late Woodland) was recovered in the road cut downslope to the north. Table 8 summarizes the associations for the site; Table 9 summarizes the materials recovered from each test and the surface collection.

Evaluation:

Aside from the single Woodland point, no diagnostics were recovered. Artifact density was extremely low and concentrated on the peak of the ridge where material was recovered to 40cm. If, as the testing indicates, the occupation was concentrated here, then the site, in all probability has been destroyed by the impact of the logging road.

In addition to these four sites, seven areas were located during previous work in the area by John Guy, Gator Grafton and Charles Stagg (DFI-7) (Fig. 8). These areas were essentially surface scatters, as subsurface testing revealed no buried components. Because of the extent of the sur-

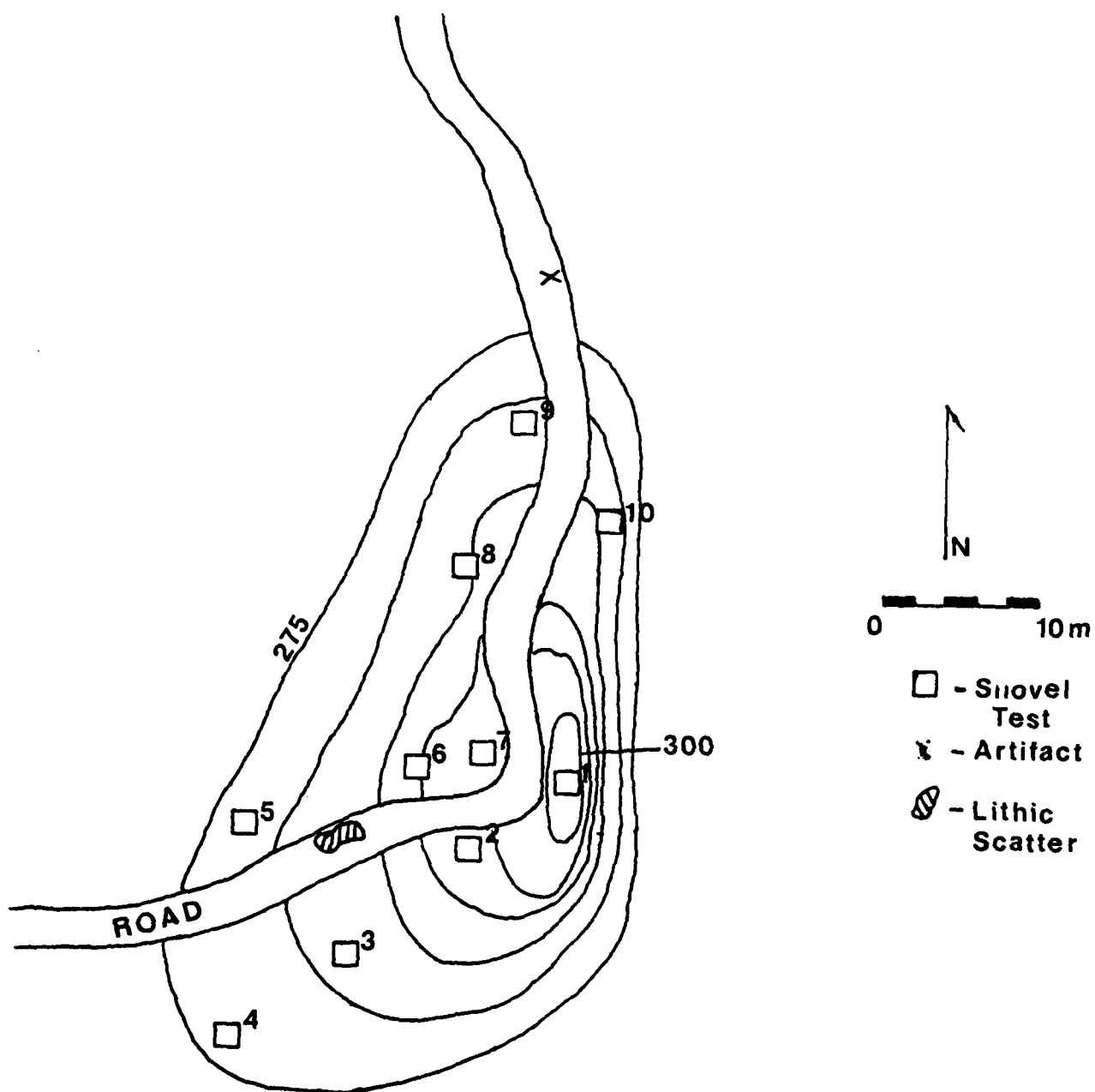


Figure 12 BZ4 Site Map 16V440

Table 8	16VN440	Description Summary	BZ4
Topographic		High Ridge (Bluff)	
Soil		Sand to 40cm Clay below to depth of test (80cm)	
Mast Vegetation		Pine	
Understory		Deciduous shrubs	
Site Size		30m x 5m (Surface)	
Site Depth		40cm (on ridgetop)	

Table 9 Site 16VN440 BZ4 Material Summary

Test	Primary Flakes	Secondary Flakes	Tertiary Flakes	Non-Diagnostic Tools	Diagnostic Tools*	Ceramics*	Historic*	Other
Surface	4	12	11	—	1 (Point) L-2)*	—	—	9 pieces Petrified wood 1 shell frag. 1 piece Quartzite
Shovel Test #1	—	3	—	—	—	—	—	1 piece sandstone
Shovel Test #2	—	4	3	—	—	—	—	6 pieces Petrified wood

*See Appendices D and E for Artifact Descriptions

Note: Only tests with material recovered are recorded.

face scatter, these areas are being considered deflated sites. As these sites lack depth and the major portion of the artifactual material was collected during the preliminary survey, the delineation of site boundaries is not possible. The integration of these sites into the settlement pattern model, however, is necessary and desirable as they contain materials from the study area.

The materials, and their associations are summarized in the following tables:

16VN441	DF 1	Table 10
16VN373	2	11
16VN371	3	12
16VN442	4	13
16VN443	5	14
16VN444	6	15
16VN445	7	16

Due to the deflated nature of these sites, and the fact that all materials have been removed, no further work should be necessary.

Three additional areas (IF1-3) (Fig. 8) contained archaeological materials, but after testing, were judged, by lack of either extent or depth, to be isolated finds. These materials and their associations are summarized in the following tables.

IF 1	Table 17
2	18
3	19

None of these areas are regarded as needing further investigation.

Conclusions and Final Model

The previously described survey of the Bayou Zourie project area suggests the following conclusions relative to geomorphology and consequent implications for the culture history of the upper Bayou Zourie drainage.

1. Most of the upland surfaces are badly eroded due to logging activity, building of tram roads, military and logging vehicle roads, vegetational denudation, training exercises, etc. Erosion is evidenced by the general exposure of red clayey sands which were probably a product

Table 10 16VN441 Site DF1

Summary Table

FP-31

Material

<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	2	4	4	1 (drill frag.) (L-3)*	—	—	—	4 pieces petrified wood Iron concretions
—	—	—	—	—	—	—	—	—

Physiography

Topographic Association

Floodplain margin

Soil

Sandy clay

Vegetation

Mixed/heavy understory

*See Appendices D and E for Artifact Descriptions

Table 11 16VN373 Site DF2

Summary

FP-36

Material

<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	4	9	23	2 (biface frags) (L4, L5)*	—	7 (C-5, C-11)*	—	1 chunk of Limestone
—	—	—	—	—	—	—	—	—

Physiography

Topographic Association

Hilltop

Soil

Sand/sandy loam

Vegetation

Pine/medium to light understory

*See Appendices D and E for Artifact Descriptions

Table 12 16VN371 Site DF3

Summary

FP-35

Material								
<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	24	9	1 (Point tip) (L-6)*	2 (Point, Point base) (L7,L8)*	—	—	Petrified wood

Physiography

Topographic

Hilltop

Soil

Sand

Vegetation

Pine/light understory

*See Appendices D and E for Artifact Descriptions

Table 13 16VN442 Site DF4

Material Summary

FP-34

<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	2	20	4	1 Biface (L9)*	—	—	—	—

Physiography

Topographic

Hillside (slope)

Soil

Sandy clay with lag gravel deposits

Vegetation

Pine/medium understory

*See Appendices D and E for Artifact Descriptions

Table 14 16VN443 Site DF5 Material Summary FP-37

<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	4	6	—	—	—	—	3 pieces petrified wood

Physiography

Topographic	Hillside (slope)
Soil	Sand/sandy loam
Vegetation	Pine/light understory

Note: In 1977 a San Patrice Point was found near this site by John Guy.

*See Appendices D and E for Artifact Descriptions

Table 15 16VN444 Site DF6 Material Summary FP-32

<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	4	6	—	—	—	—	—

Physiography

Topographic	Slope margin
Soil	Sand/sandy clay
Vegetation	Pine to mixed/medium to heavy understory

*See Appendices D and E for Artifact Descriptions

Table 16 16VN445 Site DF7 Summary FP-32A

Material

<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	26	20	4 2 biface frags. 2 (Gary 1 utilized flake points) 1 point base (L14, L15)* (L-10, 1-13)*	1 sherd (C-12)	—	—	1 piece petrified wood

Physiography

Topographic	Floodplain margin
Soil	Sandy clay to clay
Vegetation	Pine to mixed/medium to heavy understory

*See Appendices D and E for Artifact Descriptions

Table 17	Site IF-1		Summary			FP-28		
<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	—	4	—	—	—	—	—
Physiography								
Topographic			Hilltop margin					
Soil			Sandy loam					
Vegetation			Pine/light understory					

Note: No material collected.

*See Appendices D and E for Artifact Descriptions

Table 18	Site IF-2		Material Summary			FP-27A		
<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	2	1	—	—	—	—	—
Physiography								
Topographic			Hillside (slope)					
Soil			Sandy clay to clay					
Vegetation			Mixed/heavy understory					

Note: No material collected.

*See Appendices D and E for Artifact Descriptions

Table 19	Site IF-3		Material Summary				FP-27	
<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	1	1	—	—	—	—	—
Physiography								
Topographic			Slope margin					
Soil			Clay					
Vegetation			Mixed/heavy understory					

Note: No material collected.

*See Appendices D and E for Artifact Descriptions

Table 20	Site IF-4		Material Summary					
<u>Test</u>	<u>Primary Flakes</u>	<u>Secondary Flakes</u>	<u>Tertiary Flakes</u>	<u>Non-Diagnostic Tools</u>	<u>Diagnostic Tools*</u>	<u>Ceramics*</u>	<u>Historic*</u>	<u>Other</u>
Surface	—	—	—	1 (possible chopper/ scraper) (L-16)*	—	—	—	—
Physiography								
Topographic			Hilltop					
Soil			Sandy clay to clay					
Vegetation			Pine/no understory due to impact					

*See Appendices D and E for Artifact Descriptions

of Pleistocene and/or Late Holocene pine forests (Sorrenson and Mandel, 1976). The sides of hills in the north bear considerable evidence of recent colluvial deposition, probably a product of hill top erosion during logging activity. Occasional erosional remnants, usually in the form of ridges, can be observed in the study area. These are areas in which the sediments contain particularly high concentrations of sand which can act as an erosion resistant cap, a common geomorphic feature of the west central Louisiana are (Nials and Gunn n.d.). All of the sites that we observed and found to be buried in the study area were located in such erosional remnants at the junction of important stream courses. The appeal of such locations to the prehistoric inhabitants of Bayou Zouri is not hard to imagine. They would have provided relatively well drained and therefore comfortable respite from the surrounding terrain. Unfortunately, from the point of view of archaeology, such locations also provide the best routes for dependable logging roads. We can therefore predict with some confidence that the same geomorphic features which suggested the creation of sites in prehistory also attracted historic inhabitants in such a way as to result in the destruction of the prehistoric remains.

2. We suggested in the project proposal that it was unlikely that there would be any deposits in the study area, particularly in the uplands, which would date before the Mid Holocene (4500-7500 BP). Diagnostic materials recovered during the survey and during previous work in the survey area entirely support this inference. No Paleo-Indian, Early or Middle Archaic artifacts were found. There is reasonable evidence for Late Archaic and later visits to the study area, as evidenced by Gary points, Coles Creek Ceramics, and Caddoan (?) ceramics (Appendix E). The analysis of materials from Eagle Hill about 25 miles to the north shows similar pulses of upland habitation of Peason Ridge (Gunn n.d.).

The lore of site catchment analysis (Vita-Finzi and Higgs 1970, Thomas and Campbell 1978, Gunn, n.d.) suggests that about 5km is the exploitation of natural resources. The nearest known site of significant size to the Bayou Zourie study area is 16VN18 (Fredlund n.d.) which lies 4.87km from, apparently, the most important site in the study area. Such a location suggests that visits to the study area would have been made

only when resources were overexploited in the more accessible, lower zones in the drainage. The pulses of habitation in the study area surge during times that are known to have favored large populations from various parts of the southeast, (Fowler, 1974) and the pulses of habitation match these observed at Eagle Hill though with a different emphasis. The varying frequencies of diagnostic artifacts recovered from Bayou Zourie suggest a maximum amount of activity during the Late Archaic. The recovery of large numbers of Late Archaic diagnostics at 16VN18 along with a radiocarbon date of about 3100 B.P., also support a population maximum at this time. Additionally, many of the Late Archaic artifacts were found in deflated sites on the tops of hills, which further suggests a somewhat extreme resource situation. Minimal occupation of the area is indicated by later diagnostics. Analysis of the Eagle Hill material indicated maximal activity during the Coles Creek period (AD 600-900, Gunn n.d.).

While research on the climatic past of the southeast is still in a tentative stage (Gunn n.d., Sheehan n.d.), there is a marked possibility that the periods mentioned above were moist and cool in contrast to the intervening, probably dry and hot, periods. Moist and cool conditions would have encouraged vegetation on the uplands and made them more attractive to lowland dwellers, perhaps more worth the trouble of the trip.

3. The location of sites within the study area appears to be controlled by proximity to water. All of the buried sites verified in the study area are located below what is now a seep spring in the northern part of the study area, across the stream from DF1 (16VN441). The most evidence of occupation is located at the junction of the two main branches of the Bayou near BZ3 (16VN439). The area was also favored by an historical resident of pre-Fort Polk days. In addition to water, the attraction of this locale was probably the relatively flat, sandy soil on the adjoining hill, which would have served the purposes of both early European and prehistoric farming practices (Appendix F). Our observations of flora and fauna during the survey indicate that the greatest abundance of game, especially deer, and of berries, is to the north of BZ3 (16VN439). This observation is supported by occasional deer stands in the trees.

4. The question of the condition of prehistoric vegetation is always a matter of concern to settlement pattern analysis. The location of major sites in the lower topographic areas suggests that the lowlands

were accessible and perhaps preferred for travel. This probably indicates a dense mast near water which consistently shaded out underbrush and made the stream beds traversable. Most of our observations on the preferred habitats of berries were made in disturbed areas, particularly by logging roads and clear cuts. However, there is every reason to believe that people of the prehistoric southeast exacted a certain amount of control over the vegetation by burning off forests and "ringing" trees in critical resource growth zones. It is therefore unlikely that a state of climax vegetation existed in prehistory, particularly during the periods of maximal human population when resident populations were likely to have been forced to extend the productivity of their surroundings. For this reason our observations on plant growth are likely to be valid and applicable since the question is one of where edibles grow best rather than where would they grow in undisturbed conditions. We found that greenbriars, berries, and vegetation favored by prehistoric peoples grow best at the point on slopes where colluvial sands cease due to the steepness of slopes and where eroded clays appear. The reasons for this are explained in detail in Gunn, Sheehan and Garner (n.d.). Briefly, it is at the colluvium-clay interface that water and soil nutrients favored by food plants are most abundant. Before entry to the study area we expected to find sites located along the clay-colluvium interface in a situation parallel to the one found at Eagle Hill on Peason Ridge (Gunn, Sheehan, Garner n.d.). This proved not to be the case. We suggest that the limited scale of the area between streams and a desire to be close to abundant water, and perhaps the traversability of the wetter lowlands drew campers to prominences near the streams. Since the colluvium-clay interface is only a few meters from streamside locations in most instances there was no incentive to camp further from the stream than was desirable for comfort.

Recommendations

Naturally, all of the archaeological value has been long removed from the deflated sites, and the collections now in hand will provide all of the information which will ever be available concerning them. They are eroded down to the oxidized red clayey sands, probably Pleistocene, and all of the artifacts collected from the deflated surfaces. Within the limits of our power to test, which was generally about 50-60cm, the buried sites seem not to be of such significance as to warrant further work. The mixing of historic and prehistoric artifacts in particular indicates rapid and thorough bioturbation. Also, they are not located in zones designated as buildable on the maps supplied to us.

Finally, for reasons explained above, sites which were not destroyed by sheet erosion are highly likely to have been cut through in their most important parts by logging road building. There is therefore nothing to suggest, from what we know at this point, that further archaeological examination will be necessary, and none of the sites located are deemed eligible for the National Register.

ACKNOWLEDGEMENTS

We would like to thank the members of the field crew Penn Jenkins, Ralph Snavelly and Darrell Sims, for their dedication and perseverance. A special thanks to Darrell Sims, whose medical knowledge was much appreciated. The members of the Ft. Polk Environmental Office, Ron Thomas, Gator Grafton, Charles Stagg, Robert Murray and John Guy, provided us with assistance far above the call of duty, without which this project would have been infinitely more time consuming, and appreciably less productive. To Susanna Katz for her superb editorship, and Fay Johnson for her superlative typing.

Appendix A: Geology of the Bayou Zourie Environ

David O. Brown

Although the sediments of the area are not wholly uniform, more than 95% of the study area is included within a single geological mapping unit: the Castor Creek member of the Miocene Fleming formation (Welch 1942). The remaining portion is a small remnant of Quaternary Williana formation capping the high hill at the extreme southern end of the project area. Despite the imbalance in areal proportions, these two geological units represent different resources available to the aboriginal occupants of the area and may have conditioned prehistoric settlement patterns.

The Miocene Fleming Formation, which lies above the Miocene Catahoula formation and unconformably below the Quaternary Williana formation, is composed of a series of alternating calcareous and noncalcareous members representing alternating cycles of brackish water and fluvial depositional environments (op. cit., p. 47). The Castor Creek member is the next to youngest of these alternating members, being overlain by the Blounts Creek member and underlain by the Williamson Creek member. It is primarily a brackish water sediment with interfingering lentils of calcareous and noncalcareous gray clay, silt and very fine sand (op. cit., p. 57). The calcareous lentils contain white calcareous concretions of various sizes on the surface and beneath. These calcareous outcrops are characterized by a distinctive black soil and a particular vegetation assemblage. The sediments are generally unconsolidated; a few blocks of secondary limonitic sandstone are the only indurated sediments noted in the member.

One of the typical Castor Creek profiles (Table A-1) described by Welch (1942:59-60) is in the SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of sec. 6, T.1N., R.8W., only about a mile west of the study area.

Table A-1: Sediment texture and color of the Castor Creek member by Welch (1942)

	Depth in feet
Clay, light brown to gray mottled, silty.....	0
Clay, light brown to gray mottled, silt content greater.	6.5
Clay, dark yellow, very sandy, ferruginous.....	7.3

Table A-1 (Continued)

	Depth in feet
Clay, silty, greenish-gray, interlaminated with dark yellow ferruginous very sandy clay.....	7.5
Clay, dark reddish brown, very silty, mottled with greenish gray silty clay.....	9.5
Clay, greenish-gray, silty, carbonaceous, gypsiferous, coarsely arenaceous.....	10
Clay, gray, pure, gypsiferous.....	11.5
Clay, silty, gypsiferous, ferruginous.....	14.5
Clay, gray to brownish red, silt content increases downward.....	15
Clay, greenish-gray, gypsum common.....	15.5
Clay, greenish-gray, gypsum common.....	18
Clay, arenaceous.....	18.5
Clay, silty, ferruginous, small amount of gypsum.....	21

The other profiles recorded for the Castor Creek member are typically clays with some sand and silt. In addition to the clays recorded above, there are purplish-gray, yellow and purple, red and gray mottled and blue clays recorded as occurring in the member. Mineralogically, these clays are probably primarily composed of the clay mineral montmorillonite. Fisher and Garner (1965), in an analysis of clay minerals from adjacent areas of East Texas, found the clays of the Fleming formation to contain, on the average, 75 to 90 percent montmorillonite and 10 to 25 percent kaolinite. The presence of illite or larger percentages of kaolinite was rare. In the analysis of clay samples from the Miocene sediments of Vernon Parish, Welch (1942:79) found them to be dominantly montmorillonite.

Welch (1942, p. 76) points out that although there is little pure clay in Vernon Parish, the clays present should be quite suitable for the manufacture of earthenware. Thus, the aboriginal potter, with careful drying and firing techniques, could have manufactured ceramics locally at almost any site within the project area.

If clay resources are ubiquitous in the Fleming formation, gravel resources are all but absent. Welch (1942) does not mention any siliceous stone occurrences within the Castor Creek member or either of the adjacent Blounts Creek or Williamson Creek members. On the other hand, the Williana formation, which occurs as a small localized

outcrop in the southern part of the study area and in other such small outcrops near the southern portion of the area, contains some gravel throughout most of its thickness (Welch 1942:64-70). In addition to these small outcrops, the main bed of the Williana formation lies only a little more than five miles to the south of the project area. A series of commercially exploited gravel pits along this formation have produced large quantities of gravel within the first half of the twentieth century (Woodward and Gueno 1941).

Following Fisk (1938), Welch (1942) divides the Williana into three phases, a lower coarse phase, a central sandy phase and an upper silty clay phase. The lower phase contains lenses of brown chert gravel as thick as thirty feet, with individual pebbles averaging an inch in diameter but occurring up to six inches in length (Welch op. cit., pp. 65-66). Quartz, quartzite and petrified wood are also found. Although this phase thins north of the main formation area, it is likely to be present to some degree wherever Williana deposits remain since it is the basal phase.

No recent alluvial terraces are mapped within the study area although there may be small segments present in places. Terraces do occur along Bayou Zourie to the west of the project area and on Liberty Creek to the north. Smaller terrace areas occur along various tributaries of the Drakes Creek drainage system to the southeast. These terraces include remnants of the late Quaternary Prairie Terrace as well as recent Holocene terrace sediments. Although some clays might occur, these terraces would be primarily silty and sandy sediments with lenses of gravel derived from the erosion of the Williana.

Appendix B: Ethnohistorical Travel Patterns in the Southeast

Kevin Jolly and Joel Gunn

While we were performing the Bayou Zourie survey, it occurred to us that an examination of the ethnohistorical literature for preferred travel patterns might be useful for defining site locations. Since an extensive literature search for such information was not specifically budgeted, what follows is little more than a suggestion for future research.

Modern residents of western Louisiana think of travel in terms of ridge tops. These cultural biases are predicated on roads and vehicular travel. Our walking experience in the Bayou Zourie study area suggested to us that Native American inhabitants of the area may have preferred valley bottoms to ridge tops. Valley bottoms are well watered and tall trees tend to shade out the understory, making these relatively traversable. Ridges, on the other hand, are often covered with thorny vegetation. Over centuries they would probably be unpredicable routes of travel, sometimes accessible because of tall, shading trees, sometimes thorny and impassable. Unpredictability would discourage habituation as routes of travel. The net results, theoretically, would be the preferred location of sites in valley bottoms.

The Bayou Zourie study area, situated as it is on the upland margins near the headwaters of the bayou, represents a zone of floral and faunal transition. This area, while not providing the heavy biomass necessary to support a large population, would, in times of climatic population stress, provide additional resources to groups exploiting the densely populated valley bottoms. We believe that such a relationship exists between the study area and a previously recorded site 16VN18 (see conclusions). In order to further define this relationship an examination of an ethnohistorically reported travel pattern was undertaken.

Some observations on the general nature of travel patterns were apparent at the outset of the study. Travel, far from being a random behavior, represents the culmination of a series of conscious decisions. A decision to move, be it motivated by decreasing local resources, increasing population pressures, or perhaps simple boredom, defines the projected goal of travel. Having decided to move, decisions are made as to the route to be taken depending on a number of additional factors.

A short trip, for example, may follow the easiest and least circuitous route in order to arrive at the destination in the least amount of time. A longer journey, however, may proceed along a route that gives easy access to exploitable resources.

An examination of the topography associated with the route of the Natchez Trace (Cross et al. 1974) provided an overview of that particular travel route. The section examined was that portion of the trail that passes from the Tennessee River to the Mississippi at present day Natchez. This analysis revealed no readily apparent preferences related to topography. The route passes above the headwaters of several tributaries of the Tombigbee River (the Buttahatchie and Mackey's Creek) following nearly along the divide between the Tennessee and the Tombigbee. Subsequently it moves downslope to the South and West and parallels the valley of the Pearl river, which it follows closely to somewhere just south of the present town of Jackson. From here it proceeds across the upland divide between the Pearl and Mississippi drainages and to the Mississippi floodplain. Indications are that the processes involved in the establishment of such an extensive travel system are complex, yet are influenced to a large extent by the nature of the local topography. It can be likened to a continuous linear equation, with the function of local topography in constant flux. Since both upland and lowland routes are traversed, the parameters of the equation would have to be quantified to determine the relevance to Bayou Zourie. We can only suggest the relevance of such an effort here.

In the Bayou Zourie area we are able to deal with a known point of origin (hypothesized) and a known destination, with a minimal amount of topographic variation separating the two. In this case the study area is approximately 5km from the hypothesized point of origin (16VN18). This distance is within that described by Vita-Finzi and others as being the extent of daily travel for a hunting and gathering group. Because of its status as a transitional zone we assume only periodic exploitation, and it is most probable that those people exploiting this zone chose the most expeditious route to the area. Examining the topographic associations along the Bayou Zourie we find the vehicle of analogy useful in describing these associations and their relation to the hypothesized






travel patterns. The Bayou can be viewed as a trunk of a major highway system, it being the flattest, and least obstructively vegetated area near the population center. We can imagine that the bulk of the travel proceeded along this route. The upper bayou, near the study area, is marked by a series of sand capped ridges which nearly approach the permanent floodplain. These could function much like feeder roads. They provide easy access to the upland areas and related exploitable resources and are attractive, well drained camp sites. By utilizing the floodplain of the Bayou for the "quick trip" to the general area, and then proceeding along the ridge tops to the specific area to be exploited, time and energy are conserved by avoiding the hillslopes and dense vegetation of the higher drainages.

Appendix C: Principal Components and Cluster Analyses of Terrain Data

Joel Gunn

A principal components analysis was performed on the gridded terrain data. Entered into the analysis were 196 coded grid points and 11 of the previously known sites, totaling 207 points. Each point or site was coded on 7 terrain variables; their states are indicated in Table C-1.

Table C-1. Variables and states entered into the terrain analysis.

1. Elevation	feet above sea level
2. Terrain	1=buildable
	2=marginally buildable
	3=unbuildable
3. West	sine of direction of slope
4. East	cosine of director of slope
5. Slope Shape	1=hyperconcave 
	2=concave 
	3=straight 
	4=convex 
	5=hyperconvex 
6. Surface	1=flat
	2=marginally flat
	3=slope
7. Water Course	1=none
	2=hollow
	3=floodplain

The data set was submitted to principal components analysis (Nie et al. 1975). An examination of the unrotated principal components matrix showed that 5 of the 7 unrotated principal components contained significant loadings and accounted for 82% of the variance in the original data. Table C-2 shows the variables that loaded on the components and an interpretation of each. The components describe the general character of the points and sites located in the study area in terms of the geomorphology as expressed in the variables mentioned above. The interpretations are expressed verbally in terms of the positive end of the component. However, each component represents a continuum from the positive to the negative values of

the variables. Each variable is related to the component as indicated by the sign appearing in front of its variable label. As can be seen, each component refers to some combination of elevation, facing, and shape of slope. Much of the analysis is dominated by the fact that the study area is located on a southwest facing slope of the Bayou Zourie drainage. Some of the sub-areas represented by the components are dominated by flatter or rougher terrain, depending upon local conditions of erosion, etc.

The particulars of where each sub-area was located in the study area were determined by submitting component scores, calculated from the components matrix, to a cluster analysis (BMDP2M, Dixon 1977). The test squares which were determined to be in the various clustered sub-areas are illustrated in Figure 6. Explanations of the use of the clusters, relative to creation of a settlement pattern model, appear in the main body of the report.

Table C-2

<u>Factor</u>	<u>Variables</u>	<u>Component Scores</u>	<u>Composite</u>
1	Water Elevation Terrain	-.77 .65 .49	High unbuildable away from water
2	Surface Elevation NS Terrain	-.67 .49 .43 .42	High unbuildable North facing slopes
3	WE NS Slope shape Surface	.64 .52 .44 .42	North and West facing convex slopes
4	Slope shape Terrain	-.61 .44	Concave unbuildable
5	WE Terrain	-.61 .50	East facing unbuildable

Appendix D: Lithic Artifact Descriptions

L-1 (BZ-3) 16VN439
 Type: Biface Fragment (non-diagnostic)
 Length: 44mm
 Width: 25mm
 Thickness: 4mm
 Material: Tan Chert
 Utilization: None
 Notes: Large flake removed on distal end destroying biface

L-2 (BZ-4) 16VN440
 Type: Small Projectile Point (untyped, but probably Woodland)
 Length: 37mm
 Width: 20mm
 Thickness: 9mm
 Material: Light tan fine grained chert
 Utilization: Retouch along one working edge
 Notes: Blade has triangular cross section with prominent medial ridge
 See Plate # D1

L-3 (DF-1) 16VN441
 Type: Drill Fragment (bit)
 Length: 45mm
 Width: 12mm
 Thickness: 10mm
 Material: Purple quartzite
 Utilization: Massive edge damage on working edge
 Notes: Found in fire break along edge of floodplain
 See Plate #D1

L-4 (DF-2) 16VN373
 Type: Uniface Fragment
 Length: 25mm
 Width: 21mm
 Thickness: 10mm
 Material: Red fine grained chert (heat treated)
 Utilization: Some edge damage on working edge
 Notes: Unifacially worked on one edge - 70% cortex

- L-5 (DF-2) 16VN373
Type: Biface Fragment
Length: 39mm
Width: 22mm
Thickness: 10mm
Material: Red fine grained chert (heat treated) (same as L-4)
Utilization: None observed
Notes: Fractured on distal end
See Plate #3
- L-6 (DF-3) 16VN371
Type: Projectile Point Fragment (tip, non-diagnostic)
Length: 20mm
Width: 16mm
Thickness: 6mm
Material: Light tan fine grained chert (possibly heat treated)
Utilization: Possible impact fracture near tip
Notes: From surface collection
- L-7 (DF-3) 16VN371
Type: Projectile Point Base (untyped, but probably Archaic)
Length: 25mm
Width: 25mm
Thickness: 8mm
Material: Dark tan medium grained chert
Utilization: Some edge damage near the base of the blade
Notes: See plate # D1
- L-8 (DF-3) 16VN371
Type: Projectile Point (untyped, but probably Archaic)
Length: 45mm
Width: 20mm
Thickness: 8mm
Material: White banded agate
Utilization: Severe edge damage on both working edges
No retouch
Notes: Material extremely hard, producing a rather anomalous point.
See plate #3

- L-9 (DF-4) 16VN442
 Type: Biface
 Length: 65mm
 Width: 33mm
 Thickness: 12mm
 Material: Petrified wood (embedded fracture planes in the material cause it to fracture in a linear pattern along the length of the tool)
 Utilization: Possibly some edge damage on the distal end
 Notes: Due to the nature of the material the tool is extremely rough, and the evidence for edge damage is indeterminate.
- L-10 (DF-7) 16VN445
 Type: Utilized Flake
 Length: 36mm
 Width: 28mm
 Thickness: 5mm
 Material: Grey fine grained chert with possible heat treatment
 Utilization: Heavy utilization and retouch on interior edge of secondary flake
 Notes: Extremely fine grained material
- L-11 (DF-7) 16VN445
 Type: Biface Fragment
 Length: 45mm
 Width: 23mm
 Thickness: 9mm
 Material: Medium grained brown chert with cortex
 Utilization: None observed
 Notes: Tool unfinished due to large fracture on distal end
- L-12 (DF-7) 16VN445
 Type: Biface
 Length: 48mm
 Width: 25mm
 Thickness: 4mm
 Material: Medium grained yellow chert, possibly heat treated
 Utilization: None observed
 Notes: Due to shape, and careful working this is probably a projectile point pre-form. See Plate # D1

L-13 (DF-7) 16VN445

Type: Projectile Point Base (untyped)
 Length: 20mm
 Width: 20mm
 Thickness: 3mm
 Material: Pink medium grained chert, fired after construction
 Utilization: None observed
 Notes: This tool has been burned, and potlidding and fracture left it untypable

L-14 (DF-7) 16VN445

Type: Projectile Point (Gary-Archaic)
 Length: 57mm
 Width: 28mm
 Thickness: 6mm
 Material: Pink medium grained chert, similar to L-13
 Utilization: Some indeterminate edge damage of blade
 Notes: Poor construction, possibly due to the material
 Very rough
 See Plate # D1

L-15 (DF-7) 16VN445

Type: Projectile Point (Gary-Archaic)
 Length: 49mm
 Width: 25mm
 Thickness: 6mm
 Material: Ten medium grained chert with some differential heat treatment
 Utilization: Some edge damage on one blade near the tip
 Notes: Small amount of cortex in place
 Rough, but well made
 See Plate #D1

L-16 (IF-4)

Type: Chopper (pebble)
 Length: 45mm
 Width: 43mm
 Thickness: 25mm
 Material: Pink fine grained chert

Utilization: Heavy edge damage on one edge, could be due to tractor impact
Notes: Object may be a tractor-fact, extremely heavy tracked vehicle
traffic in area in which it was found.

Plate D1 (Following Page) Diagnostic Lithic and Ceramic Artifacts from the
Bayou Zourie Study Area.

16VN437 = BZ1

16VN438 = BZ2

16VN439 = BZ3

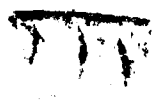
16VN441 = DF1

16VN373 = DF2

16VN371 = DF3

16VN445 = DF7

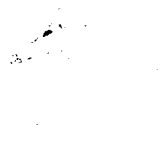
BZ 1



C1



C2



C5



C6

BZ2



L1

BZ3



L3

DF1

DF2



C7



C8



L5

DF3



L7



L8

DF7



C12



L12



L15

Appendix E: Fort Polk Survey Ceramics

David Brown

An examination of the nine sherds submitted for analysis showed them to be basically similar in manufacture and raw material characteristics to ceramics recovered from the Peason Ridge area to the north of the project area (cf Brown n.d.). Despite the similarities, each of the nine shows some distinctiveness in paste characteristics which suggest that each definitely came from a different vessel. Four of the nine sherds are decorated by incision and/or punctation, although none of these can be classified to the variety level. The two that can be clearly typed are a variant of Coles Creek that is essentially identical to similar specimens which formed the most common decorated type at the Eagle Hill II site in southern Sabine parish (ibid.) Although Coles Creek style horizontal parallel incised lines are so widely distributed in time and space as to possess only minimal diagnostic value, it is perhaps possible that these sherds were manufactured during the A.D. 800 - 1000 period indicated by radiocarbon dates from the ceramic levels at the Eagle Hill II site.

The remaining diagnostic value of the sherds is essentially negative and should not be relied on heavily in such a small sample. No engraved sherds or other clear Caddoan diagnostic indicators are present among the sherds, although Coles Creek occurs commonly throughout much of the Caddoan area typed as Davis or East. Incised and the incised-punctate combination described below could be an example of either Pennington Punctated-Incised or Crockett Curvilinear Incised, both common early Caddo types. On the other hand, any or all of the decorated types could just as easily fit with materials from the Lower Mississippi Valley culture area to the east or with the coastal culture area to the south.

Additionally, although again the sample is quite small, none of the sherds has a paste which resembles the early Tchefuncte materials, and none have shell temper, generally an indicator of later Mississippian ceramics. Therefore, they are probably most likely to fall in the mid-ceramic period, sometime after Tchefuncte and before Mississippian times. In terms of spatial indicators, no bone temper, which seems to be commoner to the west and northwest of the area, is present and no sandy paste ceramics, such as are found southwest along the coast, are present.

The following section presents a short discussion of each individual sherd, indicating typological connections where possible and briefly describing general morphological characteristics as well as the results of a microscopic scan of the sherds.

DF-2 16VN373

See Plate D1

FP-36

Sherd Nos. C5,C6,C7,C8,C9 (two fit together)

Punctated-Incised rim sherd: Exterior color: 10YR7/4;
Interior color: 10YR6/3; Thickness: 0.75cm; Weight: 2.6g

This small rim sherd has a broad, shallow incised line just beneath the exterior lip. Below that are a series of deep asymmetrical punctates arranged in horizontal and vertical rows. Because of the small size, there is not enough of a pattern present to place this sherd in an established type. It could potentially fit within a number of types, however, including Pennington Punctated-Incised (Suhm and Jelks 1962:121-2), Crockett Curvilinear Incised (op. cit. pp. 31-4), French Fork Incised (Phillips 1970:83-87), Avoyelles Punctated (op. cit.), or even, perhaps, Goose Creek Incised (Suhm and Jelks 1962:55-6).

The surface of this sherd is smoothed. Tempering is grog fragments less than 1mm to more than 2mm in diameter. The exterior surface is oxidized to a depth of approximately 2mm, while the core beneath this is black. Present in the paste are some particles of hematite, with a very few clear and translucent white moderately rounded quartz sand grains.

Plain body sherd: Exterior color: 7.5YR7/6; Interior color: 2.5Y4/1; Thickness range: 0.67 to 0.93cm; Weight: 6.5g

This body sherd is the thickest in the collection but it exhibits considerable variation and may be very close to the base of a vessel. The exterior surface is smoothed with numerous small sand grains showing in the surface. Temper is apparently grog, but grog fragments are not easily visible being the same color as the paste. It may be the case, as Weaver (1963) points out, that in many cases like this one the apparent grog is not intentional but an accidental result of the manufacturing process. However, a number of variously handled replicated ceramics made from central Louisiana clays and examined by the author show no such grog-like particles.

The paste is somewhat sandy, with clear, translucent white, and rose quartz sand grains, as well as various dark colored silicate grains (chert?). These grains are moderately to very angular in shape. The exterior half of the sherd is oxidized, while the interior half is black.

Plain body sherd (2 fragments): Exterior color: 10YR6/4; Interior color: 2.5Y6/2; Thickness: 0.56cm; Weight: 4.2g

The surface of this body sherd is quite well-smoothed, looking almost burnished; a few marks show where sand grains have been dragged through the slightly wet paste during smoothing. Temper is small tan colored grog fragments, with an apparently different distribution of sand grain size particles. There are a very few tiny quartz sand grains present, with traces of hematite particles. Exterior surface oxidation is approximately 2mm deep, with a black core.

Plain body sherd: Exterior color: 10YR7/4; Interior color: 10YR7/3; Thickness: 0.58cm; Weight: 1.7g

The surface of this small body sherd is only moderately well-smoothed. Temper is small tan grog particles. The paste of this sherd has more coarse silt or very fine sand than the other three sherds from this site. There are numerous very small sand grains of all types visible, including clear, white translucent and rose quartz, as well as the black silicate grains observed in the thick plain sherd described above. These grains vary from moderately angular to moderately rounded. Exterior oxidation depth is less than 1mm; core is black.

BZ-1 16VN437
FP-29

See Plate D1

Sherds Nos. C1, C2, C3, C4 (two fit together) and one found in May of 1979 by Guy and Grafton.

Parallel incised body sherd: Exterior color: 7.5YR7/6; Interior color: 10YR5/2.5; Thickness: 0.49cm; Weight: 3.2g

This sherd falls within the general category of the Coles Creek type (Phillips 1970:69-76), but cannot be clearly equated with a defined variety because of the lack of other diagnostic characteristics.

It has broad, shallow apparently horizontal parallel incisions. The surface is smoothed, but badly eroded. Smoothing marks are visible on the interior surface. Tempering is grog. Hematite fragments are quite com-

mon, while clear quartz and black silicate sand grains are also present. In general, medium size sand grains are common, being moderately angular to very rounded. Some apparent charcoal was observed in vessel walls.

Fingernail impressed: Exterior color: 10YR5/3; Interior color: 10YR4/1; Thickness: 0.68cm; Weight: 3.0g

This fingernail punctated body sherd has a narrow, shallow incised line running perpendicular to the long axis of the fingernail impressions. This line may separate two fields which contain punctates. Orientation of this small sherd is uncertain, but the orientation of the impressions to the line make it difficult to identify this sherd as Weches Fingernail Impressed (Suhm and Jelks:153-4), which it otherwise resembles. It might also be a variant of the lower Mississippi Valley type Evansville (Phillips 1970:78-81), although no variant can be specified.

Obvious temper is small orange and tan fragments of grog. Sand grains, including clear, white translucent and rose quartz, are common, with some much coarser grains present than in other specimens examined. Grain shapes vary from very angular to moderately well-rounded. There is a trace of hematite present. Oxidation penetrates the surface to a depth of 1 to 2mm, while the core is black.

Parallel incised body sherd: Exterior color: 10YR6/4; Interior color: 10YR4/1; Thickness: 0.49cm; Weight: 3.6g

This sherd (which includes two fragments) is well-smoothed, with wide, shallow incisions and can tentatively be identified as Coles Creek type, variant unspecified (Phillips 1970:69-76). Although the surface color, thickness and incision dimensions on this sherd suggest that it is from the same vessel as the Coles Creek sherd described above, the microscopic pore characteristics are quite different, exhibiting more variability than should be present in a single vessel.

This sherd has grog tempering, with small yellow fragments of fired clay showing in the surfaces and core; it appears to have more obvious pieces of grog than any of the other sherds examined. Hematite is very common. There are a very few tiny sand grains, including clear and rose quartz and black silicates, some of which appear to definitely be chert fragments. Most are moderately round, but a few, including the chert, are angular. Oxidation barely penetrates the surface; the majority of the core of the sherd is black.

Plain body sherd: Exterior color: 7.5YR6/3; Interior color: 10YR3/1; Thickness: 0.50cm; Weight: 2.6g

This sherd has grog temper with a moderate amount of fine and very fine sand grains including clear, white translucent and rose quartz (and perhaps gypsum crystals?). A moderate amount of very fine hematite particles is present. Oxidation penetrates the surface to a depth of 2 to 3mm, while the core is black. Some small engravings are present on one end of the sherd which vaguely resemble cord-marking, but they are apparently the result of root action in the soil.

DF-7
Sherd No. C12

16VN445

See Plate D1

Plain body sherd: Exterior color: 10YR7/3; Interior color: 10YR5/3; Thickness: 0.50cm; Weight: 1.6g

This small sherd has an indentation at one end which is probably the result of a large sand grain being removed or some accident of the smoothing process, rather than an intentional punctation. It has grog temper, with particles slightly redder than the paste matrix, some showing smooth faces. The paste is very sandy, containing grains of clear, white translucent and rose quartz, black silicates and hematite fragments, all varying from moderately angular to moderately well-rounded. The sherd has been oxidized throughout.

Appendix F: Historic Records of the Study Area

Robert Guy

The relatively flat, sandy hill which includes FP-29 and FP-30 is located in Section 33, Township 2-West 8. I examined records at the Vernon County Courthouse and the Fort Polk Land Office. As Table F-1 shows, there were 4 owners of the property between 1890 and the present. The Conveyance Record to or from Pate has not yet been found. However, personnel at the Fort Polk Land Office are sure that Pate owned the land around the turn of the century.

Table F-1 Land Owners of the FP29-30 Locale

1890	W. L. Wood
	Pate
1909	Nona Mills
1939	U. S. Army

Other than suggesting that the 1939 Ford grill belonged to Nona Mills, little can be inferred from available records. Land office officials report that a set of more detailed records were lost. It is unlikely the information contained in them will be found unless an interested individual copied them before they were lost. As a consequence we have no data on crops, prices of land and commodities, etc.

References Cited

- Brown, David
n.d. Ceramic Analysis. In Gunn, Joel. Eagle Hill draft report.
- Cross, Ralph D., Robert W. Wales, and Charles T. Traylor
1974 ATLAS OF MISSISSIPPI. University Press of Mississippi, Jackson.
- Dixon, W. J. and M. B. Brown
1977 Biomedical Computer Programs P-Series. University of California Press, Berkeley.
- Fisher, W. L. and L. E. Garner
1965 Clay and Clay Minerals. In Fisher, W. L., Rock and Mineral Resources of East Texas. University of Texas. Bureau of Economic Geology. REPORT OF INVESTIGATIONS NO. 54.
- Fisk, H. N.
1938 Geology of Grant and LaSalle Parishes, Louisiana. Louisiana Department of Conservation. GEOLOGICAL BULLETIN NO. 10.
- Fredland
n.d. Occupational Variability at 16VN18; A Multicomponent Site in the Bayou Zourie Area. In FORT POLK ARCHAEOLOGICAL SURVEY AND CULTURAL RESOURCES MANAGEMENT PROGRAM, by A. Frank Servello, The University of Southwestern Louisiana, Lafayette.
- Fowler, Don
1974 Cahokia: Ancient Capitol of the Midwest. Addison-Wesley Module in Anthropology, 48: 1-38.
- Gunn, Joel
n.d. Eagle Hill (16SA50); A QUATERNARY UPLAND SITE IN WESTERN LOUISIANA. MS Center for Archaeological Research, The University of Texas at San Antonio.
- Gunn, J., M. Sheehan, and E. Garner
n.d. Site Catchment and Settlement Pattern in Eagle Hill. A LATE QUATERNARY UPLAND SITE IN WESTERN LOUISIANA. MS Center for Archaeological Research, The University of Texas at San Antonio.
- Nials, Fred, and Joel Gunn
n.d. Geomorphology and Soils in Eagle Hill (16SA50). A LATE QUATERNARY UPLAND SITE IN WESTERN LOUISIANA. MS Center for Archaeological Research, The University of Texas at San Antonio.
- Nie, N. H., C. H. Hull, J. G. Jenkins, K. Steinbrenner and D. H. Brent
1975 STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES, SECOND EDITION. McGraw-Hill, New York.
- Phillips, Phillip
1970 Archaeological Survey in the Lower Yazoo, Mississippi,
1949-1955 PAPERS OF THE PEABODY MUSEUM OF ARCHAEOLOGY AND ETHNOLOGY, Vol. 60. Harvard University, Cambridge, Massachusetts.
- Sheehan, Mark
n.d. Flora. Gunn, Eagle Hill (16SA50): A LATE QUATERNARY UPLAND SITE IN WESTERN LOUISIANA, Center for Archaeological Research, The University of Texas at San Antonio.

- Sorenson, Curtis J., Mandel, Wallis
1976 Change in Bioclimate Inferred from Paleosols and Paleohydrologic Evidence in East Central Texas. JOURNAL OF BIOGEOGRAPHY; pp. 141-149.
- Suhm, D. A. and E. B. Jelks
1962 HANDBOOK OF TEXAS ARCHEOLOGY. Texas Archeological Society and Texas Memorial Museum. Austin.
- Thomas, Prentice, Jr., and L. Janice Campbell
1978 A MULTICOMPONENT SITE ON THE HAPPYVILLE BEND OF LITTLE RIVER, 16LA37 - THE WHATLEY SITE. New World Research; Pollock, Louisiana, Report of Investigations 11.
- Vita-Finzi, and Higgs
1970 Prehistoric Economy in the Mount Carmel Area of Palestine. Site Catchment Analysis. PROCEEDINGS OF THE PREHISTORIC SOCIETY, LONDON 36; 1-37.
- Weaver, E. C.
1963 Technological Analysis of Prehistoric Mississippi Ceramic Materials: A Preliminary Report. AMERICAN ANTIQUITY. 29(1) pp. 49-56.
- Welch, R.N.
1942 Geology of Vernon Parish. GEOLOGICAL BULLETIN NO. 22. Department of Conservation Louisiana Geological Survey. Baton Rouge.

END

DATE
FILMED

04-82

DTIC